Name:

at1124exam: Radicals and Squares (v801)

Question 1

Simplify the radical expressions.

$\sqrt{44}$ $\sqrt{12}$ $\sqrt{27}$

$\sqrt{2 \cdot 2 \cdot 11}$ $\sqrt{2 \cdot 2 \cdot 3}$ $\sqrt{3 \cdot 3 \cdot 3}$

$2\sqrt{11}$ $2\sqrt{3}$ $3\sqrt{3}$

Question 2

Find all solutions to the equation below:

$$2\left((x-4)^2-4\right) = 90$$

First, divide both sides by 2.

$$(x-4)^2-4=45$$

Then, add 4 to both sides.

$$(x-4)^2=49$$

Undo the squaring. Remember the plus-minus symbol.

$$x-4=\pm 7$$

Add 4 to both sides.

$$x=4\pm 7$$

So the two solutions are $x=11$ and $x=-3$.

Question 3

By completing the square, find both solutions to the given equation. *You must show work for full credit!*

$$x^2 - 14x = 72$$

$$x^2 - 14x + 49 = 72 + 49$$
$$x^2 - 14x + 49 = 121$$
$$(x-7)^2 = 121$$
$$x - 7 = \pm 11$$
$$x = 7 \pm 11$$
$$x = 18 \quad \text{or} \quad x = -4$$

Question 4

A quadratic polynomial function is shown below in standard form.

$$y = 2x^2 - 20x + 56$$

Express the function in **vertex form** and identify the **location** of the vertex.

From the first two terms, factor out 2 .

$$y = 2(x^2 - 10x) + 56$$

We want a perfect square. Halve -10 and square the result to get 25 . Add and subtract that value inside the parentheses.

$$y = 2(x^2 - 10x + 25 - 25) + 56$$

Factor the perfect-square trinomial.

$$y = 2((x-5)^2 - 25) + 56$$

Distribute the 2.

$$y = 2(x-5)^2 - 50 + 56$$

Combine the constants to get **vertex form**:

$$y = 2(x-5)^2 + 6$$

The vertex is at point $(5, 6)$.